Integrating the Lean Enterprise:
Incorporating LAI Research, Products, and Practice into MIT Curriculum

LAI Plenary Conference
Prof. Deborah Nightingale
April 20, 2006
Class: Integrating the Lean Enterprise
Course Overview

- Examines key issues involved with the planning, development and implementation of Lean Enterprises
- People, technology, process and information dimensions addressed in unified framework
- Emphasis placed on the integration of these dimensions across the enterprise (product development, production, supply chain, etc.)
- Information requirements and technology and process enablers for achieving enterprise integration addressed
- Analysis and transformation tools employed
- Lean enterprise transformation applications presented by industry executives
Learning Objectives of 16.852J/ESD.61J
Integrating The Lean Enterprise

• “Lean” principles and practices
  – Implications of lean vs mass
  – Lean Enterprise Model (LEM)

• Holistic view of the enterprise

• “Lean” in an enterprise context

• Value stream mapping and analysis

• Stakeholder Value
Learning Objectives of 16.852J/ESD.61J Integrating The Lean Enterprise

• Understand elements of the enterprise in context of the whole
  – Elements: customer, product development, manufacturing, supply chain, support, Finance, HR, society, etc.

• “People” and organization issues
  – Training, leadership, motivation, teaming…

• IT Issues
  – Seamless information flow, “loose/tight”, ERP, enablers and challenges
Learning Objectives of 16.852J/ESD.61J
Integrating The Lean Enterprise

• Integration / Interfacing of Enterprise Elements
  – Understand integration vs interfacing
  – Components critical for each element pairing
    – Information
    – Processes
    – Technology Enablers
    – People

• Implementation Strategies
  – Vision / Management Buy-in/Leadership
  – Change Management Principles
  – Metrics
  – Transformation Planning
  – Case Studies
  – Assessment
Learning Objectives of 16.852J/ESD.61J
Integrating The Lean Enterprise

• Future Trends
  – IT
  – e-Business
  – Knowledge Management
  – Globalization
  – Enterprise Architecting
Integrated Enterprise
Enterprise Stakeholders

- Customer Acquirers
- End Users Consumers
- Shareholders
- Partners
- Corporation
- Suppliers
- Society
- Unions
- Employees
- Enterprise

© 2006 Massachusetts Institute of Technology   Plenary April 2006 Deborah Nightingale - 9
Reference Materials

- Lean Enterprise Value – Murman et al
- Machine That Changed the World - Womack, Jones and Roos
- Lean Thinking - Womack and Jones
- Course Pack of Articles
  - Journals
  - Conference articles
  - Book excerpts
  - Trade magazines
  - White papers
Lectures

- Lean Enterprise Fundamentals
  - Lean Enterprise Overview
  - Lean Enterprise Model (LEM)
  - Value Stream Mapping
  - Enterprise Integration

- Lean Applied to Life Cycle Processes
  - Production Systems Design & Measurement
  - Framework for Lean Engineering
  - Engineering Design to Support Lean Manufacturing
  - Early Supplier Integration into Design and Development
  - Industry Case: Lean Supply Chain & Manufacturing
Lectures

• People, Organizations and Leadership in the Lean Enterprise
  – People/Organizational Issues
  – Transformational Leadership
  – Strategic Measurement in the Lean Enterprise
  – Enterprise Transition-to-Lean Roadmap
  – Change Management

• Information/Knowledge Management
  – Enterprise Resource Planning Systems (ERP)
  – Knowledge Management

• “Future Enterprises”
  – Next Generation Manufacturing Enterprises
  – e-Lean
Lectures

• Enterprise Implementation Case Studies
  - Industry Executives present “real” experiences in enterprise transformation
  - Draw from LAI Exec Board members
  - Opportunity to bring theory, research, and tools into practices

• Putting it all Together
  – Lean Enterprise Framework - a la students
  – Enterprise Team Project Presentation
Enterprise Team Project

- Enterprise Value Stream analysis of actual firms and organizations
- Spans entire business enterprise: product concept generation and development through production, delivery and support
- Consideration of extended enterprise stakeholders: suppliers, customers, partners
- Includes support processes such as, Finance, Human Resources, Marketing, Information Technology, etc.
- Entails “As-Is” assessment creating “Future-State” vision & developing transformation strategy and plan

- Utilizes LAI products:
  - TTL
  - EVSMA
  - LESAT
EVSMA Approach

Define and Characterize the Current State

Enterprise Boundaries
- Enterprise Interactions
- Stakeholder Values
- Enterprise Wastes

LESAT
Strategic Objectives

Create the Future State

Lean Enterprise Vision
5-10 years in the future
- Enterprise goals
- Vivid description
- Focus areas
- Revised system of metrics

Prioritized Improvement Plan

Close the Gap
Define the Enterprise

- Team Charter
- Enterprise Description: Boundaries, Stakeholders, Processes

Collect Data

- Prioritized Stakeholder Values
- LESAT Scores
- Enterprise Resource Allocation Based on Processes
- Current Metric Values

Construct Current State Perspectives

- Stakeholder Values Analysis
- Current State Process Map
- Process Interactions

Identify Enterprise Opportunities

- Alignment of Goals, Values, Processes, Metrics
- List of Wastes
- List of Opportunities

Describe Future State Vision

- 5 - 10-yr Goal
- Focus Areas
- Mid-point Goals

Create Transformation Plans

- Strategic Transformation Plan
- Governance Model
- Revised System of Metrics
- Communication Plan
Sample Team Projects

- Pratt & Whitney engines: large military engine enterprise; GE development partnership
- Xerox: network laser printer enterprise
- Sikorsky: S92 helicopter enterprise
- Boeing: 777 enterprise
- Ford: entire chain for one vehicle program (from customer input to product development, to production, to sales through dealerships and support)
- Navy: NAVSEA submarine enterprise
- Philippine construction company
- Hamilton Sundstrand: APU engine enterprise
Every Integrated Product Team (IPT) will have its own team composed of: Product Development, Human Resources, Finance, Marketing, Sales, Manufacturing, etc.

Customer's Needs

Customer's Value

ENTERPRISE’S VISION

CONTINUOUS IMPROVEMENT
(Maintenance of Bridge)

LEAN LEADERSHIP

CUSOTMERS

SUPPLIERS

IPT’S

COMMUNICATION VEHICLES WITHIN THE ENTERPRISE

SHAREHOLDERS
Observations/Issues

• Distant students play key role
• Incorporates emerging theory, research, application
  – LAI
  – MIT research
  – Industry cases/speakers
  – Real life projects/issues
• Explores technical, management information and process issues in integrated fashion
• Opportunity to gain further insight into MIT and LAI partner companies
Research Issues for Enterprise Integration

- Enterprise Value Stream Mapping Methodology
- Enterprise “Value” Optimization Across Multiple Stakeholders
- Interaction Analysis Methodology
- Visioning Tools
- Enterprise Modeling Tools
- Enterprise Architecting Framework
  - Information view
  - Process view
  - Product view
- Many graduate students pursue thesis work in Lean EI

Research needs are identified via class project and consortium member implementations
Class: Integrating the Lean Enterprise